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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,167	09/11/2003	Paul Reuben Day	ROC920030144US1	7591
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IBM CORPORATION ROCHESTER IP LAW DEPT. 917 3605 HIGHWAY 52 NORTH ROCHESTER, MN 55901-7829			EXAMINER PHAM, MICHAEL	
			ART UNIT 2167	PAPER NUMBER
			MAIL DATE 09/04/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/660,167

**Applicant(s)**

DAY ET AL.

**Examiner**

Michael D. Pham

**Art Unit**

2167

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 7,8 and 10-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7,8 and 10-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

**Detailed Action**

***Status of Claims***

1. Claim 1-6, 9, and 15-23 have been cancelled. Claim 7 has been amended.
2. Claims 7, 8, and 10-14 are pending in this application.

***Claim Objections***

3. Prior claim objections are respectfully withdrawn in view of amendments and remarks.
4. Claim 13 is objected to because of the following informalities: Claim 13 is dependent to a cancelled claim 9. In order to expedite the prosecution of the case, it will be assumed that claim 13 is dependent to claim 7. However, appropriate correction is required.

***Claim Rejections - 35 USC § 101***

5. Prior rejections under 35 U.S.C. 101 directed against claims 1-6 are withdrawn due to cancellation.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary

skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 7, 8, and 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5, 560, 007 by Thai (hereafter Thai) further in view of U.S. Patent 6,195,656 by Ozbutun et. al. (hereafter Ozbutun).

**Claim 7:**

Thai discloses the following claimed limitations:

“initializing a bitmap having a plurality of elements, each element of the bitmap corresponding to a record of the table, and each element initialized to an active value;” [col. 9 lines 63-65, if there is no index, the system still creates a bitmap; each bit is set equal to 1, it is assumed at the outset that all records meet the specified query condition. (initializing a bitmap having a plurality of elements and each element initialized to an active value). Col. 9 lines 66-67, as the table is scanned, records to not meet the query condition are removed (each element of the bitmap corresponding to a record of the table). ]

“running a first, primary task that individually retrieves each of the one or more records from storage according to whether the corresponding element of the bitmap has an active value;” [col. 9 lines 64-65, if there is no index, the system still creates a bitmap; each bit is set equal to 1 (bitmap has an active value), assumed at the outset that all records meet the specified query condition. col. 11 lines 2-7, once a record is retrieved (a first primary task retrieving one or more records), however the system may determine whether to filter the record. ]

“concurrently, with the first task, individually retrieving records from storage having corresponding active-value bitmap elements, changing the respective corresponding bitmap element to an inactive value for each record within the set of records; and” [col. 9 lines 64-65, if

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there is no index, the system still creates a bitmap; each bit is set equal to 1 (bitmap has an active value), assumed at the outset that all records meet the specified query condition. col. 11 lines 2-7, once a record is retrieved (a first task, individually retrieving records), however the system may determine whether to filter the record (changing the respective corresponding bitmap element to an inactive value for each record within the set of records).]

“continuing to run the first task until all records from the table, having a corresponding active-value bitmap element, have been retrieved from storage, including accessing the bitmap in the first task before at least one element is set to an inactive value by the second task to determine whether to retrieve a record from storage.” [col. 9 lines 64-65, if there is no index, the system still creates a bitmap; each bit is set equal to 1 (active value bitmap element), assumed at the outset that all records (all records) meet the specified query condition. col. 11 lines 2-7, once a record is retrieved (a first task, retrieving records before at least one element is set to an inactive value), however the system may determine whether to filter the record (at least one element is set to an inactive value by the second task to determine whether to retrieve a record from storage).]

Thai does not explicitly disclose,

“running concurrently with the first task, a second, background task that is associated with the same query as the first task and that updates the bitmap by setting to an inactive value the respective element of the bitmap corresponding to any record that does not satisfy at least a portion of the selection criteria, including:”

“scanning a column of the table using an index built over the column, the portion of the selection criteria relating to record values within the column;”

“determining a set of records whose record values within the column do not satisfy the portion of the selection criteria”

On the other hand, Ozbutun discloses col. 6 lines 41-45, each transaction only obtains a lock on the bitmap segment that it needs to update, other transactions may concurrently obtain locks on and update bits that are located in the other bitmap segments. Thus, col. 6, lines 32-34, improves locking granularity for concurrent updates because an entire segmented bitmap does not have to be treated as a single data item. Ozbutun further discloses figure 3a a table, while figure 3b a set of bitmap segments that comprise the bitmap associated with the table for the key value M. Accordingly, Ozbutun discloses “running, concurrently” (concurrently) “with the first task,” (other transactions) “a second, background task” (update) “that is associated with the same query as the first task” (bitmap, e.g. queries are for the same bitmap) “and that the updates the bitmap by setting to an inactive value the respective element of the bitmap corresponding to any record that does not satisfy at least a portion of the selection criteria” [col. 6 lines 36-40, if the transaction changes the gender indicator of row 1 to M (e.g. updates the bitmap by setting an inactive value the respective element of the bitmap), then the bit that corresponds to row 1 must be updated. In bitmap 302, the bitmap that corresponds to row 1 is located in the bitmap segment 304 (e.g. corresponding to any record that does not satisfy at least a portion of the selection criteria).]

“scanning a column of the table using an index built over the column, the portion of the selection criteria relating to record values within the column;” [element 302, figure 3B, bitmap 302 associated with the table 300 (index built over the column), elements 304, 306, 308 (the portion of the selection criteria relating to record values within the column). ]

“determining a set of records whose record values within the column do not satisfy the portion of the selection criteria” [element 304, 306, 308 of figure 3b, bitmap segment (portion of selection criteria). Col. 6 lines 50-55, corresponding bit in bitmap segment will be updated (determining a set of records whose record values within the column do not satisfy).]

Both Thai and Ozbutun are directed towards accessing databases using bitmaps. It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply the disclosure of Ozbutun of updating a bitmap concurrently with other transactions as noted above to Thai’s system for the purpose of further optimizing a bitmap query by providing concurrent transactions to the bitmap thereby avoiding locks and overhead.

**Claim 8:**

Thai discloses “determining if a retrieved record satisfies the selection criteria”[Thai, Col. 9 lines 65-67 to col. 10 lines 1-5, scans the records and determines whether each table entry satisfies the portion of the query based on the index.]; “and returning, as part of a query result set, the retrieved record if the selection criteria is satisfied”[Thai, Col. 1 lines 19-22, queries



information.].

**Claim 10:**

Thai discloses “discarding any record having a corresponding bitmap element which has an inactive value, by not retrieving that record from storage”[Col. 9 lines 66-67 to Col. 10 lines 1-4, records determined not to meet query conditions are removed from the bitmask (e.g. their corresponding bit is toggled from 1 to 0). Thus, on subsequent query operations performed for the expression, the system may restrict itself to those records remaining in the set. Col. 11 lines 5-6, the filtered out record will no longer be accessed as long as the filter remains active.].

**Claim 11:**

Thai discloses “optimizing a query plan for the query by labeling the query as a candidate for dynamic bitmap updating”[Thai, Col. 4 lines 21-24, On the fly updating bitmaps for filtered conditions (i.e. dynamically update bitmaps based on queried conditions)].

**Claim 12:**

Thai discloses “before initializing the bitmap and starting the first task and second task, determining if the query is labeled as a candidate for dynamic bitmap updating”[Thai, Col. 4 lines 9-11, optimization module employs one or more existing indices for optimizing data access.].

**Claim 13:**



Thai discloses “wherein a first order in which the one or more records is retrieved differs from a second order in which the column of the table is scanned” [Thai, col. 11 lines 5-7, On subsequent operations the filtered out record will no longer be accessed (again as long as that filter remains active).].

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. ***Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,560,007 by Thai (hereafter Thai) and U.S. Patent 6,195,656 by Ozbutun et. al. (hereafter Ozbutun) further in view of U.S. Patent 6,757,670 by Inohara et. al. (hereafter Inohara).***

**Claim 14:**

Thai and Ozbutun disclose the method of claim 7 and further disclose optimization methods based on indexes; however Thai and Ozbutun do not explicitly disclose “collecting statistics related to performance of executing the query and generating a recommendation presented to a user for creating a permanent index based on the statistics.”

On the other hand, Inohora discloses presenting optimization methods from user and using statistic information in Col. 2 lines 43-60.

Thai, Ozbutun, and Inohora are all directed towards query optimization. It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to have applied Inohora's disclosure of presenting optimization methods from user and using statistic information to the system of Thai and Ozbutun for the purpose of obtaining a good execution plan for a query (Inohora, Col. 3 lines 44-46).

***Response to Arguments***

10. Applicant's arguments with respect to claims 7, 8, and 10-14 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

11. The prior art made of record listed on PTO-892 and not relied, if any, upon is considered pertinent to applicant's disclosure.

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Contact Information***

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael D. Pham whose telephone number is (571)272-3924. The examiner can normally be reached on Monday - Friday 9am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Cottingham can be reached on 571-272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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